present such women cannot be obtained. Referring to students undergoing training with the view of teaching home arts scientifically, he said the main difficulties the instructors of these students have to contend with are that, even at this late date, a number of the students have not had any previous scientific training at the secondary school. Many of the students *will* keep their minds in water-tight compartments. To them, the science work is one thing, the domestic subjects another, and between the two they draw no connections; and, greatest of all, to develop the subject logically we have to work in the laboratory from the simple to the complex.

LORD ROSEBERY, Chancellor of the University of London, in opening University College Hall, Ealing, on Tuesday, made some remarks upon the functions of a university. The hall provides a place of residence for students at the college. In declaring the building open, Lord Rosebery said it marked another milestone on that path of university development which seemed to open broader and with more promise at every step. First, the University of London was a purely examining university, then it developed into a teaching university, and now it is a university with some of the old collegiate aspects as well. The University is no longer, if it ever was, a purely London university; it is more and more developing into an imperial university. Each day sees it summoning from every part of Great Britain and of the British Empire students anxious to obtain the advantages of its constituent schools. A university should comprehend everything that is wholesome and valuable for the development of brain and of character. The hall now opened is one of the many symptoms of the growth of corporate life in the University. University associations of various kinds are growing up, and it is obviously a very thin-blooded, one-sided university that only provides for the intellect of its students. Human sympathy, human contact, all the valuable human elements that go to build up character are required, for a university which produces nothing but brain and neglects the formation of character is no university at all. The function of a university is not merely to pump knowledge into units by teaching and to extract it afterwards by examination, but to produce living men, who are going to take a part in the vast fabric of society within these islands.

THROUGH the generosity of Mr. Edric Bayley, who gave a sum of 5000*l.* to the building extensions, and by a large supplementary sum given by the County Council, a considerable extension has been made at the Borough Polytechnic Institute. It consists, in the first place, of a large examination hall, which can also be used for entertainments and public meetings, and below this hall new laboratories and class-rooms have been built. A very complete laboratory for oil and colour work is one of the most striking of the additions. This has accommodation for forty students, besides the lecture theatre, balance room, and laboratory; there is also a portion set apart for colour mixing and for grinding of colours, so that, besides working on the test-tube scale in the laboratory, the students can work on a semi-commercial scale. There is also an extension to the bakery department and a new book-binding workshop. The opening ceremony took place on Friday evening, November 13, when Lord Carrington, in a short speech, declared the buildings open. He referred to the fact that when he was at school, although the fees were high, they learnt very little except Latin and Greek. Science and laboratory equipment were absolutely unknown, and now in London, and also in the provinces, the highest scientific training can be obtained almost for the asking. He thought that the nation owed a very great debt of gratitude to public supporting men like Mr. Bayley, who made it possible for education to be placed within the reach of even the poorest. The chairman, Mr. Spicer, in his opening remarks said that the governing body will be well repaid for any trouble they have taken by the stimulus given to the work of the institute by the erection of these new buildings. Sir Philip Magnus, chairman of the education committee of the institute, said that the governors have always resisted the temptation to use the institute as a place for obtaining degrees, as it was founded to give education to the artisan classes, and they have always kept this object in view in any alterations or extensions. The trade classes are particularly fostered in the institute. Mr. Robinson, chairman of the London County Council, expressed his pleasure at being present, and said that the County Council, before it gives money, always wishes to know whether it gets value for money, and there is no doubt that in giving to an institute of this kind value is obtained.

THERE has been in recent years a serious decline in the number of pupils studying German in the secondary schools throughout the country. It is true that many subjects clamour for increased attention and others for recognition in the curriculum of these schools, while the number of hours available for instruction is limited. Headmasters find it difficult nicely to adjudicate between the conflicting claims; but from the point of view of the man of science and of the needs of great commercial houses the claims of German to generous recognition seem very strong. We are glad, therefore, to notice that a letter on the subject, signed by representatives of the Modern Language Association, the London Chamber of Commerce Education Committee, the Society of University Teachers of German, the Teachers' Guild, and the British Science Guild has been sent to the President of the Board of Education urging the paramount importance of encouraging the study of German in secondary schools. The letter points out that there is much to do if the unfortunate decay of German teaching is to be checked, and it proceeds:—"We therefore venture to suggest that your Board should consider the desirability of calling the attention of educational authorities, governing bodies, and the principals of secondary schools to the steady decline in the study of German, and should, by means of a circular, as in the case of Latin, or such other method as may be thought fit, submit to those authorities and to the public generally the many weighty and urgent reasons for regarding an acquaintance with German as being of the first importance to great numbers of young men and women, and a widespread knowledge of the language a national necessity. We would urge, moreover, that the Board should encourage and foster schools of the type of the German Realschule and Oberrealschule, in which two modern languages, but not Latin, are taught. The latter of these in Prussia ranks in standing with the Gymnasium, and its leaving certificate confers the same rights. Of schools devoting special attention to modern, as against classical, languages, there are at present in this country very few. Lastly, we would suggest that it should, as a general rule, be required that schools should make provision for the teaching of German to those pupils who wish to learn it, as it is now required that provision should be made for the teaching of Latin."

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, May 28.—"Transparent Silver and Other Metallic Films." By Prof. Thomas **Turner.**

In a Bakerian lecture, delivered fifty-one years ago, Faraday showed that thin sheets of gold or silver, if mounted on glass and heated, became transparent. Beilby has also studied the annealing of gold-leaf and wire. The present research deals with a study of the conditions under which gold and silver become transparent, and extends the inquiry to copper and to certain other metals. It is shown that gold when about 1/300,000th of an inch in thickness becomes transparent if heated to 550° C. for a few moments. The effect is the same whether the atmosphere be oxidising or reducing, and if the supporting medium be changed. Transparency is due to the gold aggregating, and permitting white light to pass through the intermediate spaces.

In the case of silver the effect is quite different. No transparency is obtained with sheets about 1/120,000th of an inch in thickness so long as the atmosphere is a reducing one, such as hydrogen or coal gas. In air, however, transparency begins at about 240°, and is complete in a few moments at 390°. White light is now transmitted, and the transparency is remarkably complete. Transparent silver does not become opaque if heated in a reducing atmosphere, but it can be converted into the

opaque variety by burnishing, as in writing on the surface of the glass with an agate stylo. The change does not take place if silver-leaf be heated *in vacuo*, but it occurs readily with one-fiftieth of an atmosphere of oxygen. The silver does not increase in weight or the oxygen alter in volume, though oxygen appears to be necessary in order to produce the change. It is suggested that an oxide of silver may be momentarily formed and again decomposed by heat in the presence of more oxygen. The thinnest rolled metal obtainable, about 1/3000th of an inch thick, does not become transparent. Intermediate thicknesses have yet to be examined.

Thin sheet copper, about 1/75,000th of an inch in thickness, remains opaque when heated in a reducing atmosphere. In air or oxygen, however, it becomes transparent if heated for a suitable time at temperatures between about 200° and 400° C. At the lower temperatures the transparency is very marked, and the light transmitted is a brilliant emerald-green. As the temperature rises further oxidation takes place, and the colour gradually passes through olive and dark red to black. If the light-green transparent metal be treated with a diluted acid, metallic copper with a brilliant metallic lustre is obtained, while the green transparency disappears. The effect is due to oxidation, as the copper absorbs oxygen continuously during the heating.

Aluminium and Dutch metal do not appear to become transparent, nor have transparent films yet been obtained from sulphides. It is suggested that transparent films such as have now been obtained from copper are formed in all cases where a succession of spectrum colours are obtained on heating a metal in air.

Royal Microscopical Society, October 21.—Dr. J. W. H. Eyre, vice-president, in the chair.—The mouth-parts of the Nemocera, and their relation to the other families in Diptera—with corrections and additions to the paper published in 1904: W. **Wesché.**—(1) The resolution of periodic structures; (2) an auxiliary illuminating lens: E. M. **Nelson.**—*Micrococcus melitensis*: A. A. C. E. **Merlin** and E. M. **Nelson.**

Physical Society, October 23.—The meeting was held at the National Physical Laboratory, Bushy House, Teddington, by invitation of the director. All departments of the laboratory were thrown open for inspection, and, in addition, a number of special demonstrations were arranged.

Society of Chemical Industry, November 2.—Dr. Lewkowitsch in the chair.—Chemical industry in relation to agriculture: Prof. A. **Frank.** After referring to the great services of Liebig to agriculture, the author gave an historical survey of the manufacture and agricultural uses of, phosphates, and the production of potash. Ammonium sulphate, Chile saltpetre, and the utilisation of atmospheric nitrogen were also discussed, and an account was given of the author's own work in effecting the combination of atmospheric nitrogen with carbides of the alkalis and the alkaline earths. By decomposing the calcium cyanamide with water under high pressure ammonium salts are formed. Possibilities of calcium cyanamide as a fertiliser are dealt with, and some statistics relating to the output of calcium carbide are included. The work of Mond on the simultaneous production of power gas has made it possible to utilise the large stores of energy accumulated in bog areas in the form of peat. The author and Caro, with the assistance of Mond, have been able to gasify peat containing 50 per cent. to 55 per cent. of water without difficulty.

Zoological Society, November 3.—Mr. Frederick Gillett, vice-president, in the chair.—Mammals from Inkerman, near Townsville, North Queensland, collected by Mr. W. Stalker and presented to the National Museum by Sir William Ingram, Bart., and the Hon. John Forrest: Oldfield **Thomas** and Guy **Dollman.** The collection showed clearly that the Townsville region belonged faunistically to North Australia, the species being nearly identical with those of New South Wales and Victoria. Several species and subspecies were described as new.—(1) Takins from Sze-chuen and Bhutan; (2) An Indian dolphin and porpoise: R. **Lydekker.**

PARIS.

Academy of Sciences, November 9.—M. Bouchard in the chair.—The president announced to the academy the death of M. A. Ditte.—The products of the reaction of sodium amide on ketones: A. **Haller** and Ed. **Bauer.** Benzophenone, treated in benzene or toluene solution with sodium amide, if the materials are perfectly free from moisture, gives the compound $C_6H_5C(ONa)(C_6H_5)(NH_2)$, and this on treatment with water regenerates the benzophenone, together with ammonia and caustic soda. In presence of a trace of water a different reaction takes place, and the addition of water to the reaction product gives benzene, benzamide, and caustic soda. This reaction appears to be general with the aromatic ketones, anthraquinone being an exception.—The mode of formation of the Puy de Dôme and the rocks which constitute it: A. **Lacroix.** A detailed examination of the structure of the Puy de Dôme shows that it is comparable, not with Mt. Pelée, but with Guadeloupe. Each of the domes, forming the chain of the Puys, has a distinct history requiring separate examination.—M. Henneguy was elected a member of the section of anatomy and zoology in the place of the late M. A. Giard.—Physical observations of the comet 1908*c*, made at the Observatory of Lyons: J. **Guillaume.** A detailed account of the numerous changes in the appearance of the nucleus and tail of this comet observed between September 5 and October 20.—The use of compasses of great magnetic moment: Louis **Dunoyer.** A discussion of the theory of the correction of compasses of great magnetic moment (2000 to 5000 C.G.S. units). The formulæ developed have been submitted to an experimental control.—The geometrical applications of certain remarkable movements: J. **Haag.**—The formation of centres of gyration behind an obstacle in motion: Henri **Bénard.** The vortices produced behind a cylinder moving in a liquid with a uniform velocity were studied by means of kinematographic methods. The vortices were spaced at equal distances behind the moving body, this equidistance being found to be independent of the velocity, but increasing in the same direction as the viscosity of the liquid.—The ionisation of phosphorus and phosphorescence: Léon and Eugène **Bloch.** Experiments are described proving that phosphorescence, ionisation, and ozone are all produced in the same region. This region can be completely separated from the phosphorus if the velocity of the air current is increased above a certain limit, and it is possible to separate this region several metres from the phosphorus. These facts indicate that the phosphorescence, ionisation, and the ozone are not produced by the direct oxidation of the solid phosphorus, but by the oxidation of a substance emanating from the phosphorus and carried off by the gaseous current. This substance is most probably phosphorus anhydride.—The radio-activity of the gases from the thermal water of Uriage (Isère): G. **Massol.** The gases escaping from the water have a radio-activity only one-fourth of that of the gases remaining dissolved in the water. This emanation evaporates at the same time as the water; the saline residue from a half-litre of the water evaporated on the water bath was completely inactive.—The polarisation of the living man submitted to the action of the continuous current: M. **Chanoz.**—The radio-activity of the waters of Uriage-les-Bains (Isère): Paul **Besson.**—Contribution to the study of lenses: C. **Maltézos.**—A monotelephone with a note capable of regulation: A. **Blondel.** The apparatus is less sensitive than that recently described by M. Abraham, but possesses the advantage of being less easily broken.—The reaction of the ether on matter as the cause of universal attraction: O. **Keller.**—The true atomic weight of silver according to the experiments of Stas: Louis **Dubreuil.** The author has applied the method developed by him in a previous paper to the experiments of Stas on the atomic weight of silver. The general mean arrived at is 107·9021, or practically 108.—The alloys of silicon and silver: G. **Arrivaut.** The current views regarding the existence of a silicide of silver are divergent, Wöhler, Warren, and Chalmot regarding the existence as proved, Percy, Moissan, and Vigouroux holding the opposite opinion. The author has determined the melting points both of the first crystallisation and the eutectic of a series of mixtures of silver and silicon. The results do not sup-

port the view of the formation of a definite compound of the two elements.—The identity of ilicic alcohol with α-amyrine: E. **Jungfleisch** and H. **Leroux.** Ilicic alcohol was isolated by J. Personne from birdlime, and was regarded by him as an alcohol of the formula $C_{25}H_{44}O$. This alcohol is completely identified by the authors as identical with α-amyrine, an alcohol met with in various resins, but the composition $C_{30}H_{50}O$ is shown to accord best with its analysis and that of its derivatives. —Sparteine. A new method of cyclisation of α-methylsparteine by the action of iodine: Amand **Valeur.**—The eruptive rocks of Gebel Doukhan (Red Sea): M. **Couyat.** —The discovery of a Quaternary human skeleton: Émile **Rivière.** The discovery of this skeleton was announced in 1905. The present note is chiefly occupied with the proof that the skeleton is really of the same age as the deposits in which it was found.—Certain cutaneous spots resisting the action of radium and disappearing under the influence of the high-frequency spark: Foveau **de Courmelles.**—Concerning the anatomical characters of *Bradypus torquatus*: M. **Anthony.**—The presence of limestones containing *Productus giganteus* in Nova Zembla: G. W. **Lee.**—A new type of petiole of the fossil fern: Fernand **Pelourde.**—Contribution to the study of the transformation of sedimentary deposits into sedimentary rocks: J. **Thoulet.**—The seismic movements of November 6, 1908: Alfred **Angot.**—The subterranean river of La Grange, Ariège: E. A. **Martel.**

CAPE TOWN.

Royal Society of South Africa, September 16.—Mr. S. Hough, F.R.S., president, in the chair.—The pollination of *Belmontia cordata*: Dr. **Marloth.** The flowers are scented, and possess small appendages at their anthers, called Brown's bodies. They contain a sugary fluid, and this, it has been ascertained now, attracts a tiny, small insect, hardly a fifteenth of an inch long, belonging to the thrips family. The flowers possess two kinds of stigmas for the reception of the pollen, a structure which is not known from any other plant. This secondary stigma secures pollination in case the terminal stigma should not have received some pollen in time.—Embryo-sac of the Penæaceæ: Miss E. L. **Stevens.** The embryo-sac of this order differs from that of the typical angiosperm in containing sixteen nuclei instead of eight (these sixteen nuclei being organised into four egg-apparatus) and a definitive nucleus formed by the fusion of four of the nuclei. The early stages in the development of the sac show none of the polarity considered to be so characteristic of the angiosperm sac, and the whole structure of the sac is confirmatory of Dr. Pearson's hypothesis regarding the origin of the endosperm of angiosperms.—Endosperm: Prof. H. H. W. **Pearson.** It is suggested that the endosperm of the angiosperm is derived by a series of reductions and degrees of specialisation from a primitive type, essentially similar to that now found in Welwitschia. This hypothesis is strengthened by the fact that stages in this process can be identified in living angiosperms.

DIARY OF SOCIETIES.

THURSDAY, NOVEMBER 19.

ROYAL SOCIETY, at 4.30.—Memoir on the Theory of the Partitions of Numbers. Part IV.: On the Probability that the Successful Candidate at an Election by Ballot may Never at any Time have Fewer Votes than the One who is Unsuccessful; on a Generalisation of this Question; and on its Connection with other Questions of Partition, Permutation, and Combination: Major P. A. MacMahon, F.R.S.—The Propagation of Groups of Waves in Dispersive Media, with Application to Waves on Water produced by a Travelling Disturbance: Dr. T. H. Havelock.—On the Refraction and Dispersion of Krypton and Xenon and their Relation to those of Helium and Argon: C. Cuthbertson and M. Cuthbertson.—Note on Horizontal Receivers and Transmitters in Wireless Telegraphy: Prof. H. M. Macdonald, F.R.S.—On Optical Dispersion Formulæ: Prof. R. C. Maclaurin.—(1) On the Accumulation of Helium in Geological Time; (2) On Helium in Saline Minerals and its Probable Connection with Potassium: Hon. R. J. Strutt, F.R.S.—Note on the Effect of Hydrogen on the Discharge of Negative Electricity from Hot Platinum: Prof. H. A. Wilson, F.R.S.—On Measurement of Rotatory Dispersive Power in the Visible and Ultra-violet Regions of the Spectrum: Dr. T. Martin Lowry.

CHEMICAL SOCIETY, at 8.30.

LINNEAN SOCIETY, at 8.—On a New Species, Symphyla, from the Himalayas: Prof. A. D. Imms.—The Freshwater Crustacea of Tasmania, with Remarks on their Geographical Distribution: Geoffrey Smith.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—Inaugural Address by the President: Mr. W. M. Mordey.

FRIDAY, NOVEMBER 20.

INSTITUTION OF MECHANICAL ENGINEERS, at 8.—The Resistance of Materials to Impact: Dr. T. E. Stanton and L. Bairstow.—Different Methods of Impact Testing on Notched Bars: F. W. Harbord.

MONDAY, NOVEMBER 23.

ROYAL SOCIETY OF ARTS, at 8.—Twenty Years' Progress in Explosives: Oscar Guttmann.

TUESDAY, NOVEMBER 24.

ROYAL ANTHROPOLOGICAL INSTITUTE, at 8.15.—Primitive Pottery and Iron Making in British East Africa: W. Scoresby Routledge.

INSTITUTION OF CIVIL ENGINEERS, at 8.—*Further Discussion:* Glasgow Central Station Extension: D. A. Matheson.

WEDNESDAY, NOVEMBER 25.

ROYAL SOCIETY OF ARTS, at 8.—The Goldfields of Eastern Peru and Bolivia: Sir Martin Conway.

BRITISH ASTRONOMICAL ASSOCIATION, at 5.

THURSDAY, NOVEMBER 26.

ROYAL SOCIETY, at 4.30.—*Probable Papers:* Some Experiments made to test the Action of Extract of Adrenal Cortex: S. G. Shattock and C. G. Seligmann.—Further Results of the Experimental Treatment of Trypanosomiasis; being a Progress Report to a Committee of the Royal Society: H. G. Plimmer and Captain H. R. Bateman, R.A.M.C.—A Trypanosome from Zanzibar: Colonel Sir David Bruce, C.B., F.R.S., and Captains A. E. Hamerton, D.S.O., and H. R. Bateman.—The Proportion of the Sexes produced by Whites and Coloured Peoples in Cuba: W. Heape, F.R.S.—Further Researches on the Etiology of Endemic Goitre: Captain R. McCarrison, I.M.S.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—Domestic Electricity Supply (including Heating and Cooking) as affected by Tariffs: W. R. Cooper.

FRIDAY, NOVEMBER 27.

PHYSICAL SOCIETY, at 5.

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